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Case No.: 58446US002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	MEKALA, DAVID R.		
Application No.:	10/666626	Confirmation No.:	9235
Filed:	September 18, 2003	Group Art Unit	1745
Title:	FUEL CELL GAS DIFFUSION LAYER		

AMENDED BRIEF ON APPEAL

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May 7, 2008 — Phyllis J. Boettcher
Date — Signed by: Phyllis Boettcher

Dear Sir:

This is an appeal from the Office Action mailed on June 13, 2007, finally rejecting claims 1-12 and 30.

Fees

☐ Any required fee under 37 CFR § 41.20(b)(2) will be made at the time of submission via EFS-Web. In the event fees are not or cannot be paid at the time of EFS-Web submission, please charge any fees under 37 CFR § 1.17 which may be required to Deposit Account No. 13-3723.

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A Notice of Appeal in this application was transmitted on December 13, 2007, and was received in the USPTO on December 13, 2007. A Notice of Non-Compliant Appeal Brief was mailed on April 7, 2008.

Appellants request the opportunity for a personal appearance before the Board of Appeals to argue the issues of this appeal. The fee for the personal appearance will be timely paid upon receipt of the Examiner's Answer.

REAL PARTY IN INTEREST

The real party in interest is 3M Company (formerly known as Minnesota Mining and Manufacturing Company) of St. Paul, Minnesota and its affiliate 3M Innovative Properties Company of St. Paul, Minnesota.

RELATED APPEALS AND INTERFERENCES

Appellants are unaware of any related appeals or interferences.

STATUS OF CLAIMS

Claims 1-30 are pending. Claims 13-29 are withdrawn. Claims 1-12 and 30 stand rejected and are the subject of the Appeal.

STATUS OF AMENDMENTS

No amendments have been filed after the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The claims at issue concern a fuel cell gas diffusion layer (Specification at p. 4, ln. 19 – p. 5, ln. 24). The gas diffusion layer, or GDL, is a component of a polymer electrolyte membrane fuel cell. The claims at issue concern a GDL that comprises a hydrophilic surface layer (Specification at p. 5, ln 25 – p. 6., ln 21) having a thickness of no more than 0.5 micron (Id.), and, thereunder, a hydrophobic second layer (Specification at p. 5, ln 21 – p. 6., ln. 9) comprising a fluoropolymer (Id.) having a thickness of at least 5 microns (Id.). The application of a hydrophilic surface layer having a thickness of no more than 0.5 micron is enabled throughout the present Specification, including the present Examples (Specification at p. 9, ln. 26 – p. 12, ln 15.)

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

First Ground of Rejection

Claims 1-4, 6 and 30 stand rejected under 35 USC § **103**(a) as purportedly unpatentable over WO 03/058743 (**Barton**) **taken alone.**

Second Ground of Rejection

Claims 5-7 stand rejected under 35 USC § **103**(a) as purportedly unpatentable over **Barton taken alone.**

Third Ground of Rejection

Claims 8-10 stand rejected under 35 USC § **103**(a) as purportedly unpatentable over **Barton taken alone and further in view of** JP 11-045733 (**Nagamori**).

Fourth Ground of Rejection

Claim 11 stands rejected under 35 USC § **103**(a) as purportedly unpatentable over **Barton taken alone and further in view of** WO 02/022952 (**Segit**).

Fifth Ground of Rejection

Claim 12 stands rejected under 35 USC § **103**(a) as purportedly unpatentable over **Barton taken alone and further in view of** US 6,083,638 (**Taniguchi**).

ARGUMENT

First Ground of Rejection

Claims 1-4, 6 and 30 stand rejected under 35 USC § **103(a)** as purportedly unpatentable over WO 03/058743 **(Barton) taken alone.**

The present claims recite a fuel cell gas diffusion layer ("GDL") having "a hydrophilic surface layer having a thickness of no more than 0.5 micron." (Claim 1) The Examiner admits that "Barton does not expressly teach a hydrophilic surface layer that has a thickness of no more than 0.5 micron." (June 13 Office Action at page 3, lines 8-9). However, the Examiner asserts that the present claims are obvious in light of a purported disclosure in Barton of a fuel cell GDL bearing a hydrophilic layer with a thickness of "about 1 to about 100 microns, preferably between about 8 and about 16 microns." (Barton at page 14, lines 18-20). As the Examiner admits, this passage fail to teach the claim 1 limitation of "a thickness of no more than 0.5 micron." More importantly, this passage of Barton *teaches away* from that limitation, since it recites a preferred thickness of "between about 8 and about 16 microns." (Id.). The Examiner asserts that the 0.5 micron limitation found in the present claims could be found by routine experimentation to optimize a result effective variable based on the teaching of Barton. The Examiner provides no support for the assertion that Barton teaches that the thickness of the hydrophobic layer is a results effective variable. In fact, 1) Barton teaches a very broad range of values for that variable (1-100 microns), 2) Barton also teaches a very broad range of *preferred* values for that variable (8-16 microns), 3) the present claim limitation lies well outside both of the broad ranges recited in Barton for that variable, and 4) the recitation of the preferred range in Barton is a clear *teaching away* from the present claim limitation and the present invention.

This lack of any teaching or suggestion in Barton of "a hydrophilic surface layer having a thickness of no more than 0.5 micron" (Claim 1) is not surprising, since the methods taught in Barton would not be expected to *enable* a fuel cell GDL having such a thin a hydrophilic surface layer. Barton purportedly teaches formation of a hydrophilic layer by coating a slurry or solution (Barton at p. 13, ln. 20 – p. 14, ln. 5) and purports to exemplify the use of rod coating (Barton at p. 17, ln. 25 – p. 20, ln. 38). In contrast, one method of forming so thin a hydrophilic layer taught in the present Specification involves plasma treatment of the surface of a GDL. While the present claims contain no process limitations and are not limited to the use of any process in

particular, it does not appear that the very thin hydrophilic surface layer required in the present claims is enabled in Barton.

For all of these reasons, this rejection of claims 1-4, 6 and 30 under 35 USC § 103 should be reversed.

Second Ground of Rejection

Claims 5-7 stand rejected under 35 USC § **103**(a) as purportedly unpatentable over **Barton taken alone**.

The Second Ground of Rejection relies on the use of Barton in the same manner as the First Ground of Rejection and should therefore be reversed for all of the same reasons.

Third Ground of Rejection

Claims 8-10 stand rejected under 35 USC § **103**(a) as purportedly unpatentable over **Barton taken alone and further in view of** JP 11-045733 (**Nagamori**).

The Third Ground of Rejection relies on the use of Barton in the same manner as the First Ground of Rejection and should therefore be reversed for all of the same reasons.

Fourth Ground of Rejection

Claim 11 stands rejected under 35 USC § **103**(a) as purportedly unpatentable over **Barton taken alone and further in view of** WO 02/022952 (**Segit**).

The Fourth Ground of Rejection relies on the use of Barton in the same manner as the First Ground of Rejection and should therefore be reversed for all of the same reasons.

Fifth Ground of Rejection

Claim 12 stands rejected under 35 USC § **103**(a) as purportedly unpatentable over **Barton taken alone and further in view of** US 6,083,638 (**Taniguchi**).

The Fifth Ground of Rejection relies on the use of Barton in the same manner as the First Ground of Rejection and should therefore be reversed for all of the same reasons.

CONCLUSION

For the foregoing reasons, appellants respectfully submit that the Examiner has erred in rejecting this application. Please reverse the Examiner on all counts.

Respectfully submitted,

May 7, 2008
Date

By: _____
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CLAIMS APPENDIX

Claims involved in the Appeal:

1. (Previously Presented) A fuel cell gas diffusion layer comprising a hydrophilic surface layer having a thickness of no more than 0.5 micron, and, thereunder, a hydrophobic second layer comprising a fluoropolymer having a thickness of at least 5 microns.

2. (Original) The fuel cell gas diffusion layer according to claim 1 wherein said hydrophobic second layer comprises dispersed particles of carbon and a fluoropolymer.

3. (Original) The fuel cell gas diffusion layer according to claim 1 wherein said hydrophobic second layer comprises a carbon fiber construction coated with a fluoropolymer.

4. (Original) The fuel cell gas diffusion layer according to claim 1 additionally comprising a supporting third layer underlying said second layer.

5. (Original) The fuel cell gas diffusion layer according to claim 4 wherein said supporting third layer comprises a carbon fiber construction coated with a fluoropolymer.

6. (Original) The fuel cell gas diffusion layer according to claim 2 additionally comprising a supporting third layer underlying said second layer.

7. (Original) The fuel cell gas diffusion layer according to claim 6 wherein said supporting third layer comprises a carbon fiber construction coated with a fluoropolymer.

8. (Original) The fuel cell gas diffusion layer according to claim 1 wherein said hydrophilic surface layer comprises functional groups containing Si or a metal.

9. (Original) The fuel cell gas diffusion layer according to claim 1 wherein said hydrophilic surface layer comprises functional groups containing Si.

10. (Original) The fuel cell gas diffusion layer according to claim 1 wherein said hydrophilic surface layer comprises functional groups containing Si and O.

11. (Original) A roll good comprising the fuel cell gas diffusion layer according to claim 1.

12. (Original) The fuel cell gas diffusion layer according to claim 1 wherein said hydrophilic surface layer is present on less than all of said hydrophobic second layer, according to a pattern.

30. (Original) A fuel cell electrode comprising the fuel cell gas diffusion layer according to claim 1 and a layer of fuel cell electrode catalyst in contact with said hydrophilic surface layer.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.